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मानक



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Mazdoor Kisan Shakti Sangathan

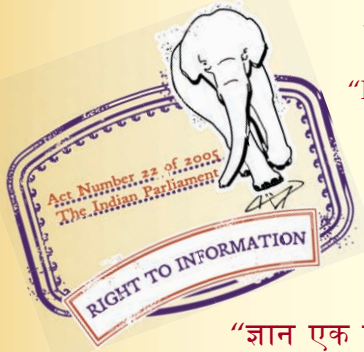
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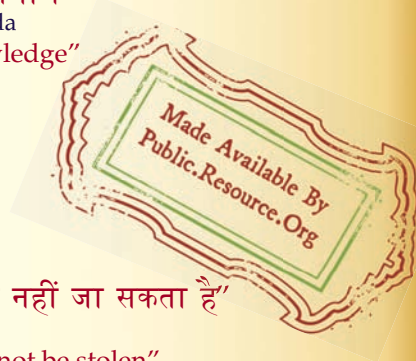
IS 4838 (1990): Anthropometric dimensions for school children age group 5-17 years [CED 35: Furniture]



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Satyanarayan Gangaram Pitroda

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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“पुनरीक्षण १९९३”
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IS 4838 : 1990

भारतीय मानक
स्कूली बच्चों आयुवर्ग 5-17 वर्ष के लिए
मानवमितीय आवाम
(दूसरा पुनरीक्षण)

Indian Standard

ANTHROPOMETRIC DIMENSIONS FOR
SCHOOL CHILDREN AGE GROUP 5-17 YEARS
(*Second Revision*)

UDC 572'087 : 572'512 — 053'5

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 5

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 23 March 1990, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in two parts. Part 1 was published in 1969 which covered the anthropometric dimensions for children of age group 5 to 11 years and Part 2 was published in 1968 and revised in 1979, covered the anthropometric dimensions of school children of age group 12 to 16 years. In this revision Parts 1 and 2 are merged into one standard and average height of Indian children up to the age of 17 years based on the ICMR studies have been given.

This revision, apart from giving more information gives ratio between standing height and dimensions used in designing school furniture and educational spaces.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this Standard.

*Indian Standard***ANTHROPOMETRIC DIMENSIONS FOR
SCHOOL CHILDREN AGE GROUP 5-17 YEARS***(Second Revision)***1 SCOPE**

1.1 This standard gives in detail the standing heights and anthropometric dimensions of children belonging to age group between 5-17 years. It also graphically represents body measurements, reach dimensions, eye-levels and ratios of body segments with standing height. Ratios between standing height and dimensions used in designing educational spaces and furniture is also given.

2 DETAILED DIMENSIONS**2.1 Design Height of Indian Children**

Design height of Indian children belonging to age group between 5-17 years and mode of measurements of standing height is given in Table 1. This has been worked out after eliminating domicile and sex factors from the results of studies brought out by Indian Council of Medical Research (ICMR). The difference in height due to sex after puberty has been given due weightage as stipulated in the above mentioned study.

2.2 Body Measurements

Body measurements of children are given in Tables 2 and 3.

2.3 Reach Dimensions

Reach dimensions for vertical and horizontal activity postures of children are given in Tables 4 and 5.

2.4 Eye-Levels

Eye-levels for squatting, sitting and standing postures of children are given in Table 6.

2.5 Circulation Spaces

Circulation spaces to standing heights of children are given in Table 7.

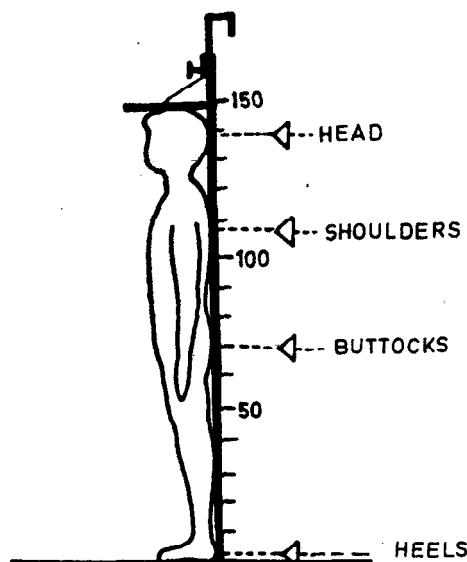
3 DESIGN DIMENSIONS

3.1 Ratios between standing height and design dimensions used in designing educational spaces, furniture and fittings are given in Table 8.

**Table 1 Mean and Standard Deviations for Standing Heights of Indian Children
Age Group 5-17 Years**

(Clause 2.1)

All dimensions in millimetres.



Age in Years	Standing Height as per ICMR, New Delhi								Design Height for School Children	
	Boys				Girls				Boys	Girls
	Urban		Rural		Urban		Rural		Urban/ Rural	Urban/ Rural
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	Mean
5	1 027	67	1 011	63	1 021	72	995	72	1 016	1 016
6	1 093	71	1 074	64	1 080	92	1 063	79	1 079	1 079
7	1 145	71	1 132	81	1 133	82	1 119	73	1 134	1 134
8	1 198	74	1 186	73	1 187	80	1 172	74	1 187	1 187
9	1 241	73	1 230	86	1 234	80	1 222	65	1 233	1 233
10	1 287	79	1 281	80	1 291	85	1 267	70	1 284	1 284
11	1 339	79	1 324	83	1 344	99	1 312	73	1 334	1 334
12	1 388	85	1 374	80	1 398	89	1 367	82	1 396	1 386
13	1 453	101	1 435	91	1 445	97	1 415	73	1 442	1 442
14	1 514	104	1 483	91	1 480	67	1 453	72	1 504	1 474
15	1 568	96	1 531	91	1 502	86	1 477	69	1 557	1 496
16	1 603	98	1 575	88	1 513	75	1 496	60	1 595	1 510
17	1 619	81	1 604	76	1 518	60	1 501	60	1 615	1 515

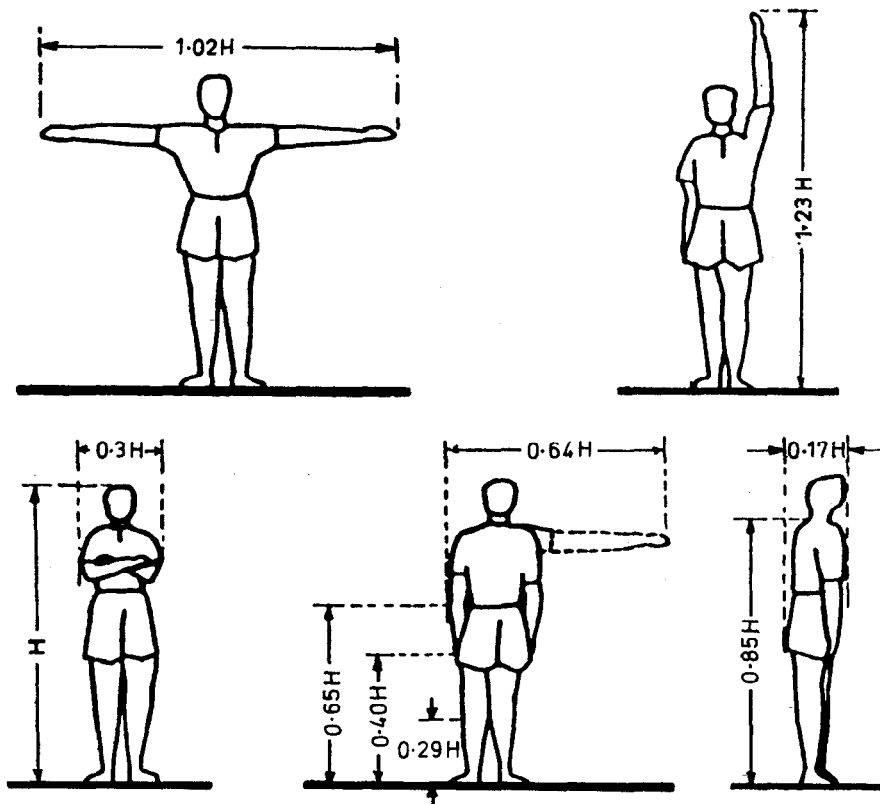
NOTES

1 Design heights have been worked out after eliminating domicile and sex factors from the ICMR Standards. However, the difference in standing height due to sex after puberty has been given due weightage.

2 Puberty age for girls.

Table 2 Body Measurements in Standing Postures
(Clause 2.2)

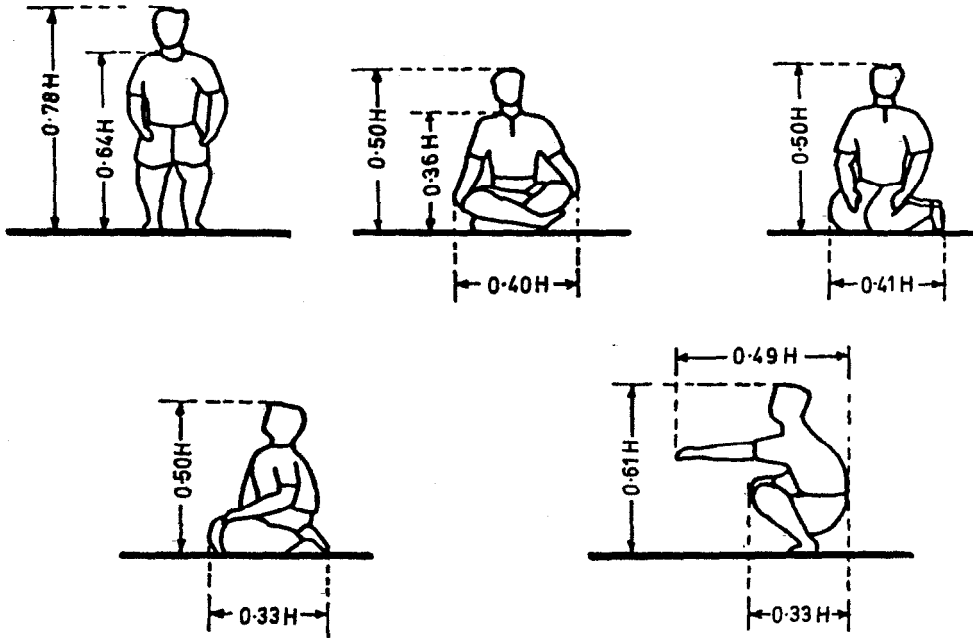
All dimensions in millimetres.



Age in Years	Body Measurements—Standing Posture									
	0.17 H	0.29 H	0.30 H	0.40 H	0.64 H	0.65 H	0.85 H	H	1.02 H	1.23 H
5	173	295	305	406	650	660	864	1 016	1 036	1 250
6	183	313	324	432	691	701	917	1 079	1 101	1 327
7	193	329	340	454	726	737	964	1 134	1 157	1 595
8	202	344	356	475	760	772	1 009	1 187	1 211	1 460
9	210	358	370	493	789	801	1 048	1 233	1 258	1 517
10	218	372	385	514	822	835	1 091	1 284	1 310	1 579
11	227	387	400	534	854	867	1 134	1 334	1 361	1 641
12	236	402	416	554	887	901	1 178	1 386	1 414	1 705
13										
G	245	418	433	577	923	937	1 226	1 442	1 471	1 774
B	256	436	451	601	963	978	1 278	1 504	1 534	1 850
14										
G	251	427	442	590	943	958	1 253	1 474	1 503	1 813
B	265	452	467	623	996	1 012	1 323	1 557	1 588	1 915
15										
G	254	434	449	598	957	972	1 272	1 496	1 526	1 840
B	271	463	479	638	1 021	1 037	1 356	1 595	1 627	1 962
16										
G	257	438	453	604	966	982	1 234	1 510	1 540	1 857
B	275	468	485	646	1 034	1 050	1 373	1 615	1 647	1 986
17										
G	258	439	455	606	970	985	1 288	1 515	1 545	1 863

Table 3 Body Measurements in Sitting and Squatting Postures
(Clause 2.2)

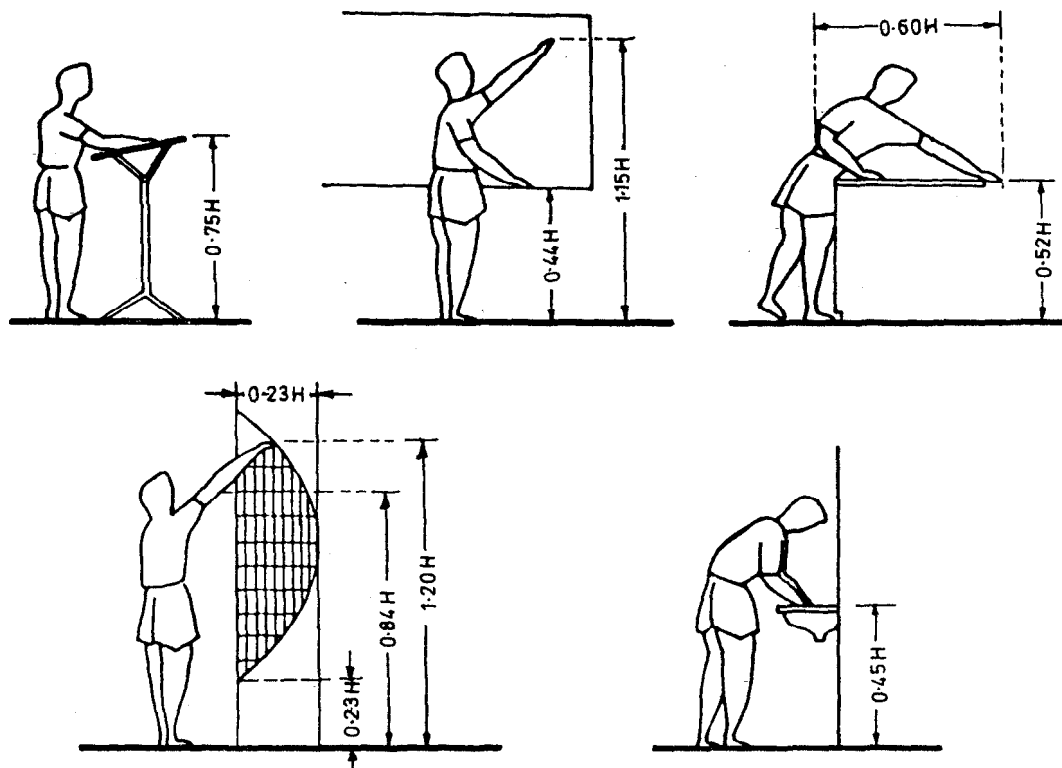
All dimensions in millimetres.



Age in Years	Body Measurements								
	0.33 H	0.36 H	0.40 H	0.41 H	0.49 H	0.50 H	0.61 H	0.64 H	0.78 H
5	335	366	406	417	498	508	620	650	792
6	356	388	432	442	529	540	658	691	842
7	374	408	454	465	556	567	692	726	885
8	392	427	475	487	582	594	724	760	926
9	407	444	493	506	604	617	752	789	962
10	424	462	514	526	629	642	783	882	1 002
11	440	480	534	547	654	667	814	854	1 041
12	457	499	554	568	679	693	845	887	1 081
13									
G	476	519	577	591	707	721	880	923	1 125
B	496	541	610	616	737	752	917	963	1 173
14									
G	486	531	590	604	722	737	899	943	1 150
B	514	561	623	638	763	779	950	996	1 214
15									
G	494	539	598	613	733	748	913	957	1 167
B	526	574	638	653	782	798	974	1 021	1 244
16									
G	498	544	604	619	740	755	921	966	1 178
B	533	581	646	662	791	808	985	1 034	1 260
17									
G	500	545	606	621	742	758	924	970	1 182

Table 4 Reach Dimensions in Standing Postures
(Clause 2.3)

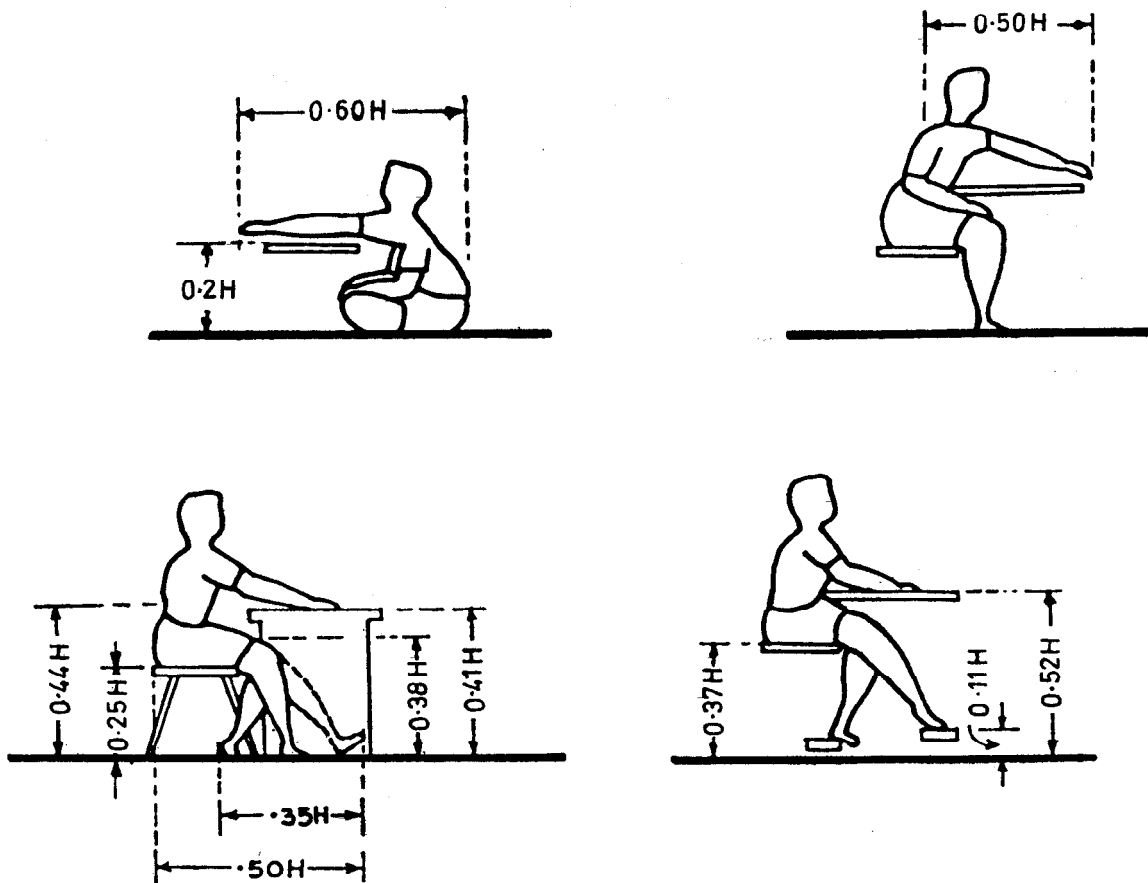
All dimensions in millimetres.



Age in Years	Reach Dimensions								
	0.23 H	0.44 H	0.45 H	0.52 H	0.60 H	0.75 H	0.84 H	1.15 H	1.20 H
5	234	447	457	528	610	762	853	1 168	1 219
6	248	475	486	561	647	809	906	1 241	1 295
7	261	499	510	590	680	851	953	1 304	1 361
8	273	522	534	617	712	890	997	1 365	1 424
9	284	543	555	641	740	925	1 036	1 418	1 480
10	295	565	578	668	770	963	1 079	1 477	1 541
11	307	587	600	694	800	1 001	1 121	1 534	1 601
12	319	610	624	721	832	1 040	1 164	1 594	1 663
13									
G	332	634	649	750	865	1 082	1 211	1 658	1 730
B	346	662	677	782	902	1 128	1 263	1 730	1 805
14									
G	339	649	663	766	884	1 106	1 238	1 695	1 769
B	358	685	701	810	934	1 168	1 308	1 791	1 868
15									
G	344	658	673	778	898	1 122	1 257	1 720	1 795
B	367	702	718	829	957	1 196	1 340	1 834	1 914
16									
G	347	664	680	785	906	1 133	1 268	1 737	1 812
B	371	711	727	840	969	1 211	1 357	1 857	1 938
17									
G	348	667	682	788	909	1 136	1 273	1 742	1 818

Table 5 Reach, Widths and Heights in Sitting and Squatting Postures
(Clause 2.3)

All dimensions in millimetres.

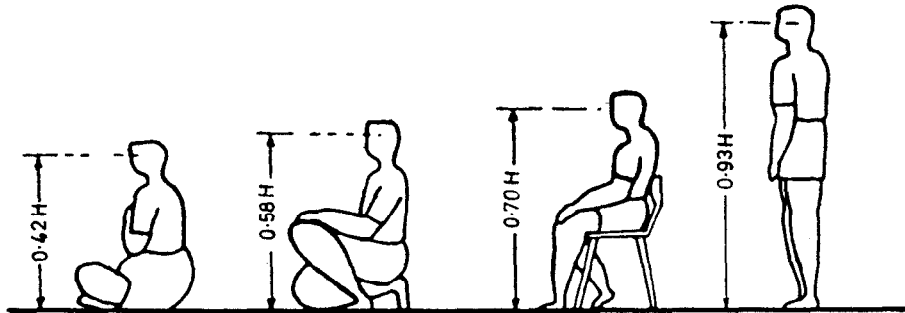


Age in Years	Reach, Widths and Heights										
	0.11 H	0.20 H	0.25 H	0.35 H	0.37 H	0.38 H	0.41 H	0.44 H	0.50 H	0.52 H	0.60 H
5	112	203	254	356	376	386	417	447	508	528	610
6	119	216	270	378	399	410	442	475	540	561	647
7	125	227	284	397	420	431	465	499	567	590	680
8	131	237	297	415	439	451	487	522	594	617	712
9	136	247	308	432	456	469	506	543	617	641	740
10	141	257	321	449	475	488	526	565	642	648	770
11	147	267	334	467	494	507	547	587	667	694	800
12	152	277	347	485	513	527	568	610	693	721	832
13											
G	159	288	361	505	534	548	591	634	721	750	865
B	165	301	376	526	556	572	616	662	752	782	902
14											
G	162	295	369	516	545	560	604	649	737	766	884
B	171	311	389	545	576	592	638	685	779	810	934
15											
G	165	299	374	524	554	568	613	658	748	778	896
B	175	319	399	558	590	606	653	702	798	829	957
16											
G	166	302	378	529	559	574	619	664	755	785	906
B	178	323	404	565	598	614	662	711	808	840	969
17											
G	167	303	379	530	561	576	621	667	758	788	909

**Table 6 Eye-Level Dimensions for Squatting, Sitting and Standing Postures of Children
Age Group 5-17 Years**

(Clause 2.4)

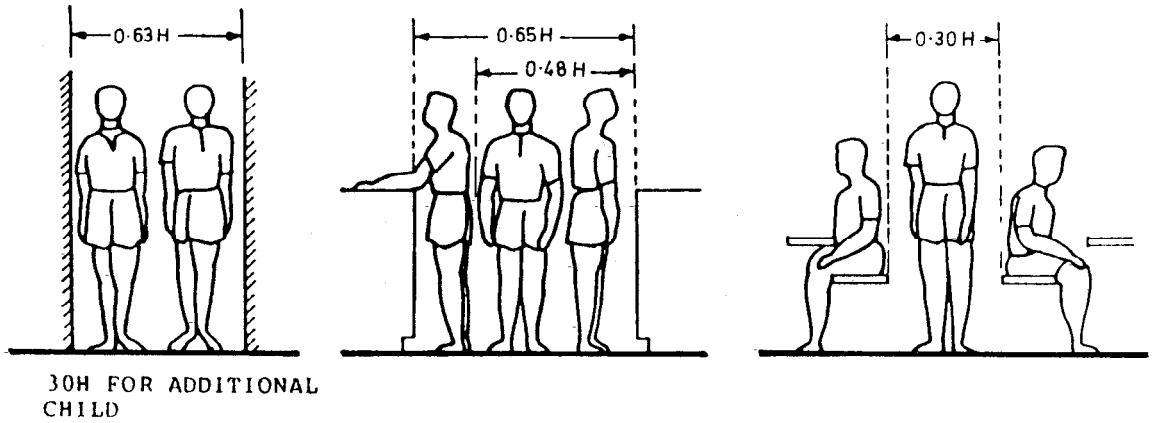
All dimensions in millimetres.



Age in Years	Eye-Levels			
	0.42 H	0.58 H	0.70 H	0.93 H
5	427	589	711	945
6	453	626	755	1 003
7	476	658	794	1 055
8	499	688	831	1 104
9	518	715	863	1 147
10	539	745	899	1 194
11	560	774	934	1 241
12	582	804	970	1 289
13				
G	606	836	1 009	1 341
B	632	872	1 053	1 399
14				
G	619	855	1 032	1 371
B	654	903	1 090	1 448
15				
G	628	868	1 047	1 391
B	670	925	1 117	1 483
16				
G	634	876	1 057	1 404
B	678	937	1 131	1 502
17				
G	636	879	1 061	1 409

Table 7 Circulation Spaces
(Clause 2.5)

All dimensions in millimetres.



Age in Years	Circulation Spaces			
	0.3 H	0.48 H	0.63 H	0.65 H
5	305	488	640	660
6	324	518	680	701
7	340	544	714	737
8	356	570	748	772
9	370	592	777	801
10	385	616	809	835
11	400	640	840	867
12	416	665	873	901
13	433	692	908	937
14				
B	451	722	948	978
G	442	708	929	958
15				
B	467	747	981	1 012
G	449	718	942	972
16				
B	479	766	1 005	1 037
G	453	725	951	982
17				
B	485	775	1 017	1 050
G	455	727	954	985

Table 8 Ratios Between Standing Height and Dimension Used in Designing School Furniture and Educational Spaces

(Clause 3.1)

STANDING POSTURE	RATIO	FIXTURES & FITTINGS	RATIO
Standing height	1.00 H	Window pane	
Eye height	0.93 H	—Upper reach	1.20 H
Depth of body-standing	0.17 H	—Lower reach	0.53 H
Width of body-standing	0.30 H	Height of hook	1.00 H
Arms outstretched-length end to end	1.02 H	Height of door knob	0.63 H
One arm outstretched	0.64 H	Height of switch	0.80 H
Height with arm vertically upright	1.23 H	Height of lower edge of mirror	0.75 H
		Height of sink top	0.50 H
		Height of wash-basin top	0.45 H
		Height of urinal top	0.41 H
CIRCULATION SPACES	RATIO	SITTING POSTURE	RATIO
Width of corridor for 2-children	0.63 H	Seated height	0.78 H
Circulation space between 2-standing work surfaces	0.65 H	Seated eye height	0.70 H
Circulation space between 2 seats	0.30 H	Elbow height	0.41 H
		Height of seat	0.25 H
		Width of seat	0.25 H
WORKING SURFACE STANDING	RATIO	Front of knee to buttock	0.34 H
Height of work surface		Height of stool	0.37 H
—Central work	0.52 H	Width of stool	0.20 H
—Ironing/Planning	0.50 H	Depth of stool	0.16 H
—Cooking	0.48 H	Height of footrest	0.11 H
—Filing metal	0.56 H	Depth of seat	0.24 H
Height of lectern	0.75 H	Floor to top of thigh	0.38 H
Forward reach-maximum	0.60 H	Comfortable zone for leg movement	0.35 H
		Top of backrest to floor	0.44 H
		OTHER POSTURES	RATIO
WORKING SURFACE SEATED	RATIO	<i>Sitting lotus</i>	
Height of desk/table	0.41 H	Sitting lotus height	0.50 H
Width of desk/table	0.40 H	Sitting lotus eye-height	0.42 H
Reach-maximum	0.50 H	Sitting on knee eye-height	0.58 H
Reach-optimum	0.39 H	Knee to knee width	0.40 H
		Sitting lotus depth	0.31 H
VERTICAL SURFACE	RATIO	Sitting lotus forward reach	0.60 H
Chalk-board		Work surface top from floor-sitting lotus	0.20 H
—Upper reach	1.15 H	Shoulder width	0.25 H
—Lower reach	0.44 H	<i>Sitting sideways</i>	RATIO
Storage reach-maximum	1.20 H	Maximum width	0.41 H
—Optimum height-convenient	1.10 H	Maximum depth	0.33 H
—Lower height-convenient	0.23 H	SQUATTING	RATIO
—Upper height-convenient	0.84 H	Squatting	0.61 H
—Convenient depth	0.23 H	Squatting depth	0.33 H
		Squatting forward reach	0.49 H

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